DER Certification Laboratory Pilot, Accreditation Plan, and Interconnection Agreement Handbook

Subcontract Number: NAD-1-30605-13

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NREL Technical Monitor: Tom Basso

Electric Distribution Transformation Program

2004 Annual Program and Peer Review Meeting,
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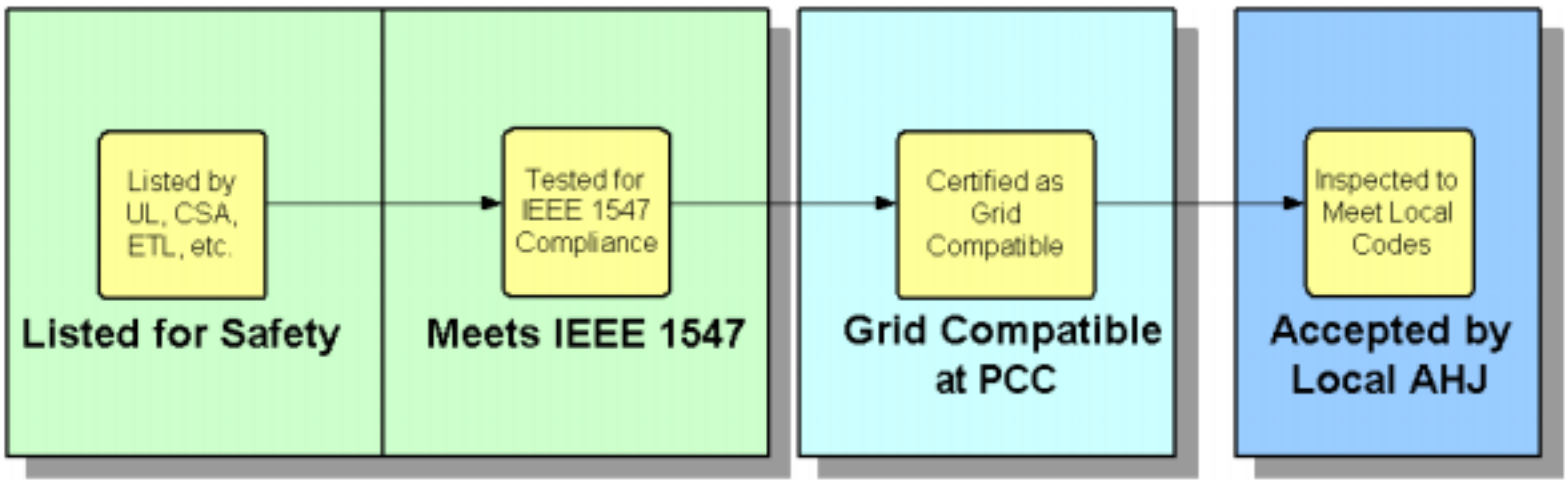
Project Perspective

- **Objective** –
  - To create the needed organization, procedures, plans and tools that support certification of grid interconnection equipment and accreditation of test laboratories
  - To establish tools that support simplified interconnection agreements
- **Relevance** – Enable the addition of generation capacity, voltage support, and congestion relief by simplifying the evaluation and approval process required to effectively integrate distributed generation and storage resources.

Technical Approach

- **Develop Organization and Draft a Plan**
  - Modeled after existing plans, e.g. ANSI, OSHA's NRTL, and NREL's Certification and Accreditation Plan for PV Modules
- **Promote industry-wide consensus**
  - Organize stakeholders and create advisory board
  - Solicit stakeholder inputs on testing and reporting procedures
  - Develop standard test criteria with rationale and expected results
- **Demonstrate a certification and lab accreditation pilot**
  - Applicable to broad spectrum of grid interconnection equipment and stakeholder communities
  - Draft test protocols for two types of DG interconnection equipment
  - Conduct pilot testing to demonstrate the certification and accreditation model plan
- **Develop tools to support simplified interconnection agreements**
  - Test protocols for certification of grid interconnection equipment
  - Interconnection agreement handbook
  - Web-based resources and training
  - Organizational workshops
- **Identify and screen candidate laboratories for accreditation**

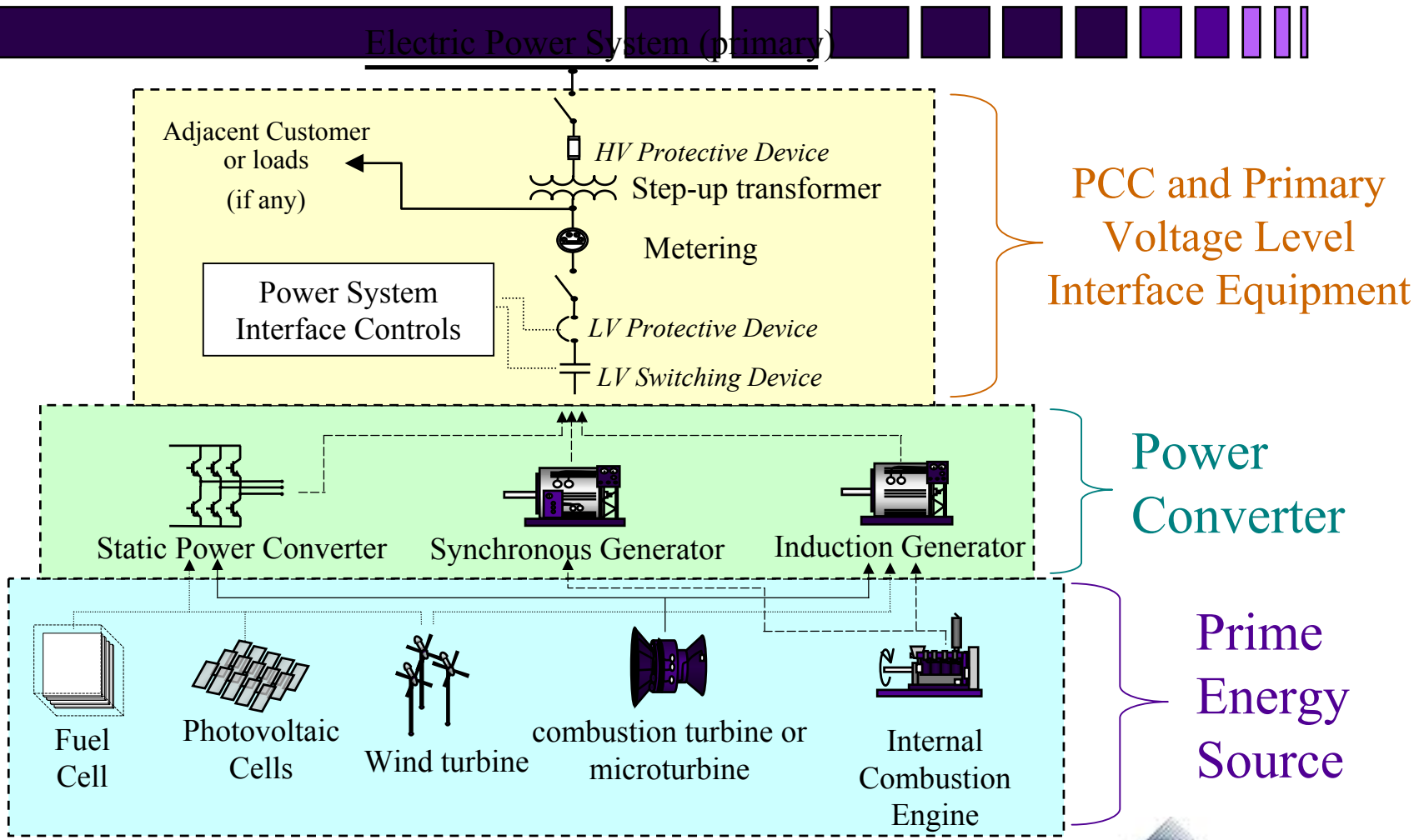
Conceptual Process for Certification of Interconnection Hardware



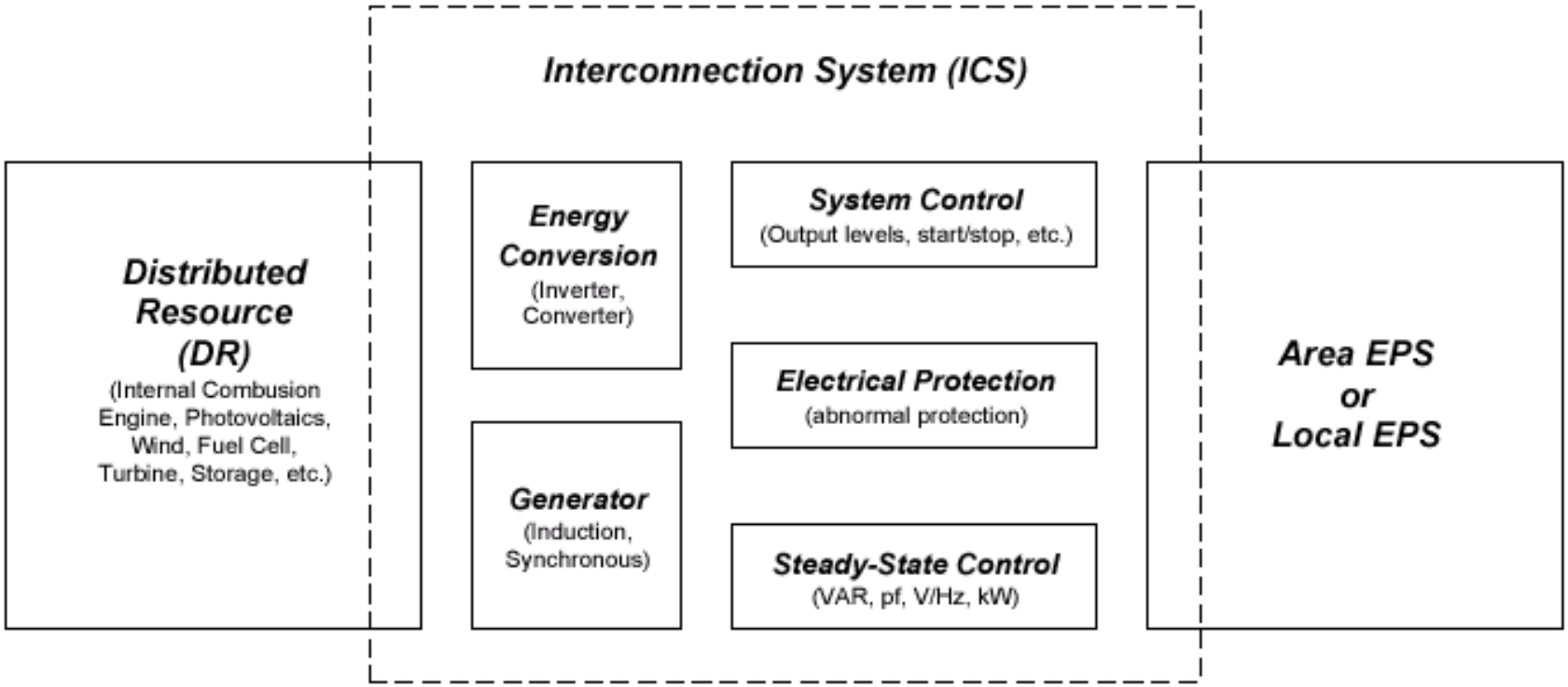
Base Period Progress and Accomplishments

- Engaged and organized stakeholders
- Developed Draft Certification and Accreditation
- Drafted Certification Criteria
- Reviewed State DER Interconnection Rules Agreements
- Planned Interconnection Agreement Handbook
- Created DER Interconnection Web Site (Beta)

Levels of Equipment that Define a DER Site



IEEE1547.1 Defined the Interconnection System (ICS)



Definition of the installation and its content

Variety of Interconnection Hardware

Inverters

Multifunction Relays

Disconnect Switch

Paralleling Switchgear

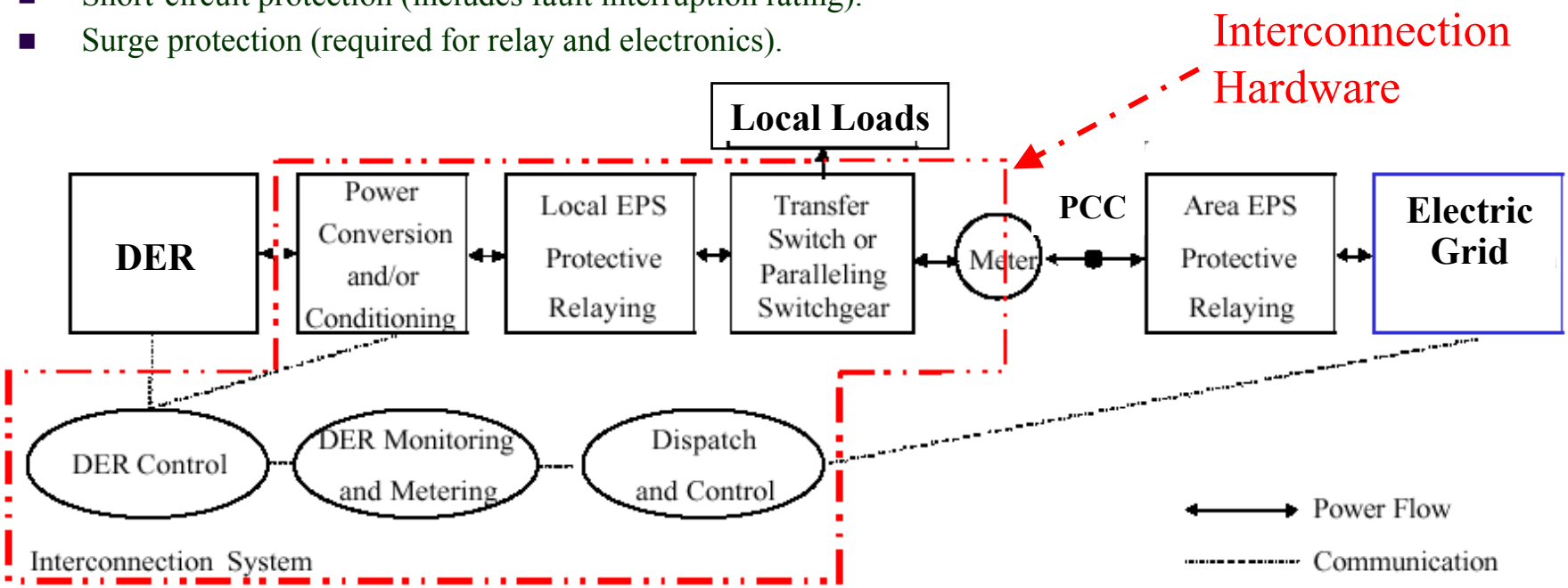
Paralleling Control and Transfer Switches

Meter-base Interconnection

Functions and Relative Location of Interconnection Hardware in DER

Basic Functions of Interconnection Hardware

- Electrical isolation via power transformer.
- Controlled connection and disconnection (includes a load-break contactor and paralleling control).
- Visible and secure (lockable) disconnect.
- Short-circuit protection (includes fault interruption rating).
- Surge protection (required for relay and electronics).



Ref. NREL/SR-560-32459 DER Interconnection Systems: Technology Review and Research Needs

EPRI PEAC The Power of Reliability

Certification Criteria are needed for both Inverter and Relay-Controlled Connection

Full-scale DER systems under test (controls are integrated in the Inverter)

OR

Multi-function relays from DER units

Standard relay tester (Omicron CMC 256-6 or equal)

Multi-function relays used in DER

Project Interactions and Collaborations

- Areas that need to be considered
  - State and Federal (FERC) regulatory actions
  - Economics, costs Vs benefits
  - Availability of practical interconnection hardware
  - Quality, availability, and reliability
  - Education and training
- Organizations with Related Activities
  - Department of Energy, DPP interconnection projects
  - California Energy Commission PIER
  - New York, Texas, California and other states rules
  - EPRI and Utility Industry Interconnection Research
  - Other Private and Public Activities Research

Life-Cycle Project Timeline

Milestones/Deliverables

BASE PERIOD (Tasks 1 - 2)

- Organize Stakeholders
- Web-Based Resource Site (Beta)
- Discussion Draft Certification and Accreditation Plan
- Draft Labeling Criteria
- Interconnection Handbook Outline and Plan

OPTION PERIOD 1 (Tasks 3 - 5)

- Pilot Testing of Interconnection Equipment
- Report of Pilot Testing and Updated Web Site
- Final Draft Plan for Certification and Lab Accreditation
- Final Draft Interconnection Agreement Handbook

OPTION PERIOD 2 (Tasks 6 – 8)

- Draft Test Protocol for 2nd DG Equipment
- Conduct 2nd Pilot Testing to Demo Efficacy of Final Draft Model Plan for Certification and Accreditation
- Web-Based Interconnection Handbook
- Web-Based Training Courses
- Survey of Potential Certification Labs

Budgets

	Total ($K)	DOE/NREL ($K)	Subcontractor ($K)
Base Period (2001-2003)	$ 265	$ 147	$ 118
Option Period 1 (2003-2004)	$ 294	$ 163	$ 131
Option Period 2 (2004-2005)	$ 360	$ 200	$ 160
Total	$ 919	$ 510	$ 409

Impacts and Benefits

- Plans, procedures and tools for pre-certification of DER interconnection equipment to reduce the complexity, time and cost of connecting DER to the grid
  - ***Utilities*** **will be able to provide their customers information on pre-certified DER systems which meet safety and performance standards.**
  - ***DER equipment manufacturers*** **will better understand key issues for developing compatible DER systems**
  - ***Professional service companies*** **will be able to determine future roles in DER market**
  - ***Critical DER component suppliers*** **will better understand industry needs**
  - ***Academia*** **will better identify and define courses and conduct more focused R&D projects**
  - ***Associations and standards-making bodies*** **will exchange information and avoid duplication of effort**

Planned Activities for FY04

- Pilot Testing & Report on Interconnection Equipment
- Update Certification Resources Web Site
- Finish Certification and Lab Accreditation Plans, identify various scenarios/paths to certification
- Finish Interconnection Agreement Handbook
- Obtain stakeholder input on all of above
- Other Reporting
  - Monthly and Annual Technical Progress Reports
  - Quarterly and Annual Peer Review Meetings

Current Events

- IEEE 1547 has been developed and approved… (1547.1 testing protocol, .2, .3 all underway)
- Several states have developed procedures for streamlining interconnection (CA rule 21, NY, TX, NARUC efforts)
- FERC is in final stages of setting rules "Standardization of Small Generator Interconnection Agreements and Procedures for interstate T&D (NOPR RM02-12-000)
- Creation of OETD and Electric Distribution Transformation Program with new emphasis on grid support

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

NEWS RELEASE

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FOR IMMEDIATE RELEASE
July 23, 2003
Docket Nos. RM02-1-000 and RM02-12-000

COMMISSION SETS NEW GENERATOR INTERCONNECTION STANDARDS, PROPOSES EXPEDITED PROCEDURES FOR SMALL GENERATORS; ACTIONS WILL FACILITATE INFRASTRUCTURE DEVELOPMENT

The Federal Energy Regulatory Commission issued today standard procedures and a standard agreement for the interconnection of generators larger than 20 megawatts – actions designed to facilitate development of needed infrastructure for the nation's electric system. The Commission also proposed expedited procedures for small generators.

The rule covering the larger generators will reduce interconnection time and cost, help preserve reliability, increase energy supply, and lower wholesale prices for the nation's customers by increasing the number and variety of independent generators that

Considerations going forward

- How to build certification process around IEEE 1547
  - Type, production, and commissioning tests of 1547.1
  - Component Vs System Hardware Certification
  - Pre-existing hardware listings and performance certifications
- Utilities require location-specific checks at DER installation site…what is role of pre-certification or commissioning tests?
- Impact of FERC rules on distribution-level certification process.

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